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A useful common reference in providing professionally appropriate care of laboratory animals for scientific institutions is presented. Recommendations are based on scientific principles, expert opinion, and experience with methods and practices that have proved to be consistent with quality. A selected bibliography is included in periodicals and comprehensive general references. (RK)

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Guide for

LABORATORY ANIMAL FACILITIES and CARE

Prepared by the
COMMITTEE ON REVISIONS OF THE GUIDE FOR LABORATORY ANIMAL FACILITIES AND CARE
of the
INSTITUTE OF LABORATORY ANIMAL RESOURCES
NATIONAL RESEARCH COUNCIL

(Third Revised Edition 1968)

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Committee on the Revision of the Guide for

LABORATORY ANIMAL FACILITIES AND CARE
of the Institute of Laboratory Animal Resources

The Institute of Laboratory Animal Resources was organized in November 1952 under the auspices of the National Academy of Sciences-National Research Council. Acting in an advisory capacity, the Institute disseminates information and educational material on laboratory animal resources and establishes standards.

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Preface

More than 75,000 copies of the *Guide for Laboratory Animal Facilities and Care* have been distributed since the first edition was published in March 1963. The *Guide's* reception in the scientific community has been very favorable. It is serving as a useful common reference for institutions conducting animal care programs.

The primary purpose of the *Guide* continues to be to assist scientific institutions in providing professionally appropriate care for laboratory animals. The recommendations are based on scientific principles and on expert opinion and experience with methods and practices that have proved to be consistent with high quality care.

Suggestions for improvement have been incorporated in the third edition in keeping with a statement in the Introduction to the first edition that "the *Guide* . . . must be a living document, subject to change with changing conditions and new information."

This edition has been prepared by the Institute of Laboratory Animal Resources of the National Research Council under contract PH 43–64–44, task order 12, supplement 1, administered by the Animal Resources Branch, Division of Research Facilities and Resources, National Institutes of Health.

The Institute's Committee on the *Guide* acknowledges with appreciation the role of the American Association for Laboratory Animal Science in developing the concept of the *Guide* and in preparing the first edition.

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Introduction

The scientific community has long recognized a scientific and ethical responsibility to provide humane care for experimental animals used in the service of man and animals. This commitment to high standards is expressed in the codes guiding animal experimentation and care adopted by numerous scientific societies and institutions and in recently adopted federal, state, and local legislation. The *Guide* extends these codes by defining humane care in professional terms and describing the facilities that provide humane care.

There is growing recognition that the care of laboratory animals is an institutional responsibility as well as the responsibility of individual investigators. The animal care programs of most large institutions are based increasingly on this partnership of responsibility; the recommendations in the *Guide* assume it. Section I deals with methods of animal care. The recommendations are a synthesis of knowledgeable experience and opinion based on scientific principles and concepts. This section is intended to provide a yardstick against which institutions can measure and evaluate their animal care programs. The Committee believes that the routine operation of institutional animal facilities should be guided by these recommendations, just as the American Association for Accreditation of Laboratory Animal Care (AAALAC) uses them in its accreditation program. Sections II and III, dealing with personnel and physical plant, are intended to supplement Section I and to assist scientific institutions in planning the human and physical resources needed to assure the adequacy of their animal care programs.

The Committee recognizes that the nature of the animal facilities and the specific methods used in implementing the animal care program will vary with the type and size of the scientific institution. It also recognizes that the proper scientific control of certain experiments may require modification of recommendations in the *Guide* in the interest of the research. It emphasizes that nothing in the *Guide* is intended to limit the investigator's freedom and obligation to plan and conduct animal experiments in accordance with accepted scientific practice. Finally, it hopes the permissive language of the *Guide* will encourage investigators to

seek new and better methods of laboratory animal care and maintain the *Guide* as "a living document, subject to change with changing conditions and new information."

The *Guide* may contain errors of omission and commission. Corrections and suggestions may be forwarded to the Institute of Laboratory Animal Resources, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

I. Laboratory Animal Housing and Care

Comfortable housing is an essential element in good animal care. Comfort depends on a variety of subjective and objective factors that interact differently in different institutions. Accordingly, it is impossible to develop a single definition of comfortable housing that is applicable to all institutions. Experienced animal-care workers know that the well-being of animals is not entirely dependent on a modern physical plant and the newest housing equipment. Well-trained and motivated personnel frequently can overcome physical deficiencies to assure high quality animal care. Therefore, for the purposes of the *Guide*, comfortable and satisfactory housing is defined as any system of management, care, and housing that permits animals to grow, mature, reproduce, or behave normally in the laboratory, and be maintained in good health. Some of the specific considerations that give meaning to this definition are outlined in this section.

A. Housing

1. *Criteria for evaluating a caging or housing system*

The caging or housing system is perhaps the most important single element in the physical environment for laboratory animals. Inasmuch as the well-being of the animals and the control of experiments are influenced by the housing system, it should always be designed carefully. The following criteria may be used to evaluate the caging or housing system:

(*a*) It should meet the investigator's research requirements. Rarely are the requirements for research incompatible with the satisfactory housing of animals. Thus, animals may need to be housed singly or in groups; in cages, runs, or pens. When toxic, infectious, or radioactive substances are used special housing facilities may be needed to satisfy research or safety requirements.

(*b*) It should be designed with the animals' physical comfort as a primary consideration. Physical comfort, as applied specifically to the housing system, includes keeping the animal dry and clean; maintaining the animal in a state of relative thermal neutrality; providing sufficient space

to assure freedom of movement and allow for normal postural adjustments; avoiding unnecessary physical restraint; providing convenient access to clean food and water; and, if animals are group housed, maintaining them in compatible groups without overcrowding.

(*c*) It should be compatible with the maintenance of the animals in good health as measured by such factors as the maintenance of normal body weight and the prevention of the spread of communicable diseases.

(*d*) It should be designed to facilitate effective sanitary maintenance and technical servicing. For example, animal cages with bends and crevices, which may be difficult to clean, should be avoided since the entire system should permit easy and complete cleaning; feeders and watering devices should be easily accessible for filling or changing.

(*e*) Cages, runs, and pens should be kept in good repair to prevent injury to the animal and to promote physical comfort. Particular attention should be paid to avoiding sharp corners and edges or broken wires and to maintaining cage floors in good condition to prevent injury.

2. *Exercise*

One of the most widely debated questions in the field of animal care concerns the need for "exercise" or physical activity in the housing of laboratory animals, most specifically in the housing of dogs. The precise relationship between energy expenditure during physical activity and the animals' well-being is unknown. The concept of "exercise" frequently is confused with release of animals from confinement in cages. Confinement in a cage is equated with lack of "exercise" and physical discomfort, while release from confinement is equated with "exercise" and physical well-being. Confinement *per se* does not necessarily influence the amount of "exercise" an animal engages in, or an animal's well-being.

For the purpose of the *Guide*, "exercise" is defined as any physical activity. On this basis, whether dogs and other animals are "exercised" and what form it should take are matters for professional judgment. If exercise is needed, it may be provided in any of several ways such as by using a treadmill or exercise wheel, by walking animals on a leash, by providing access to runs, or by releasing animals from their cages in the animal room.

Cages are necessary and useful for intensive postsurgical care, for isolation of sick animals, for metabolic studies, and for short-term holdings of dogs (one to three months). There are, however, practical reasons for providing pens, runs, or other out-of-cage space in dog housing areas. In addition to providing more oppor-

tunity for "exercise," pens or runs also provide a convenient place to hold dogs while their cages are being cleaned. When dogs are allowed out of their cages regularly, sanitary maintenance of the cages is simplified. In addition, when dogs are held for longer than three months, their physical comfort can be maintained more easily if runs or pens are provided. Finally, the availability of runs or pens makes possible the housing of dogs in compatible groups.

Similar professional judgment should be applied when determining exercise needs of large domestic animals such as horses and cattle. If exercise is needed, loafing areas, exercise lots, pastures, or controlled exercise are suitable.

B. Sanitation practices

1. *Cleanliness*

(*a*) The animal facility should be kept clean. A regular schedule of sanitary maintenance is necessary, including the elimination of radiological and toxicological wastes.

(*b*) Animal rooms, corridors, storage areas, and other parts of the animal facility should be washed, scrubbed, vacuumed, mopped, or swept as often as necessary using appropriate detergents and disinfectants to keep them free of dirt, debris, and harmful contamination. A continuing objective should be to keep these areas neat and uncluttered. Radiological and toxicological monitoring may also be required.

(*c*) If litter or bedding is used in animal cages or pens, it should be changed as often as necessary to keep the animals dry and clean, and to minimize offensive odors. For routine maintenance of small rodents, such as rats, mice, or hamsters, one to three such changes per week ordinarily should suffice. For larger species such as dogs, cats, and nonhuman primates, daily changing of cage or pen litter may be necessary.

Daily changing of bedding for the large domestic animals is necessary to maintain cleanliness and sanitation. It may also be necessary to clean stanchions or tie stalls twice daily.

(*d*) Cages or pens from which animal waste is removed by hosing or flushing should be cleaned one or more times daily. This system may require removal of the animals during servicing in order to keep them dry.

(*e*) Animal cages, racks, and accessory equipment, such as feeders and water bottles, should be washed and sanitized as often as is necessary to keep them physically

clean and free from contamination. Ordinarily, this can be achieved by washing the cages and accessories once or twice weekly, and the racks every other week. In addition, cages should always be sanitized before new animals are placed in them. It is a good practice to have extra cages available at all times to allow for a systematic cage-washing schedule. The washing or rinsing, or both, should be conducted at a temperature of 180° F. or higher to assure destruction of most pathogenic organisms. Sanitizing may also be accomplished with appropriate disinfecting detergents. Where radioactive or toxic contamination is a problem, a system of equipment monitoring should be instituted.

(*f*) Waste containers and implements should be maintained in sanitary condition. It is a good practice to line the waste cans with disposable liners and to wash each waste can every time it is emptied, using the same methods as suggested above for animal cages. As with animal cages, the minimum wash or rinse temperature, or both, should be 180°F. or disinfecting detergents should be used.

2. *Sanitary waste disposal*

(*a*) All waste should be collected and removed in a safe, sanitary manner. If waste cans are used, they should be made of metal or plastic, be leakproof, and be equipped with tight-fitting lids. It is good practice to use leakproof disposable containers such as plastic sacks or plastic lined paper bags as liners in waste cans, for disposal of animal tissues, carcasses, and radiological or toxicological wastes. (See sec. III. G and H.)

(*b*) Highly infectious wastes should be rendered noninfectious, by autoclaving or other effective means, before removing them from the animal facility.

(*c*) Waste materials should be removed regularly and frequently. If storage of waste prior to removal is necessary, the storage area should be physically separated from other storage facilities, and free from flies, cockroaches, rodents, and other pests. Cold storage is necessary to prevent decomposition of biological waste.

3. *Vermin control*

(*a*) Cockroaches, flies, bedbugs, escaped or wild rodents, and similar pests constitute a menace in any animal facility. Their elimination or effective control should be considered mandatory.

(*b*) Vermin control programs should be instituted in new

buildings prior to occupancy. Effective control and ultimate elimination can be attained in older buildings, even where heavy infestation has occurred. This can be accomplished by sealing or eliminating all breeding sites, and by using pesticides or trapping procedures in conjunction with a strict program of sanitary maintenance. Pesticide application must be carried out under professional supervision in order to avoid toxic effects on the animals and possible interference with experimental procedures.

C. Personal hygiene and personnel health program

1. *Personal hygiene*

(*a*) The maintenance of high standards of personal cleanliness among animal colony personnel is obligatory. The facilities necessary for meeting this obligation should be provided.

(*b*) To aid in maintaining a high standard of personal hygiene, laboratory clothing suitable for use in the animal facility should be provided. This clothing should be changed as often as necessary to enable personnel to maintain a neat and clean appearance. Suitable facilities should be available for storage of street clothing during the workday.

2. *Personnel health program*

(*a*) A well organized occupational health program is mandatory for personnel working in laboratory animal facilities. It should include preplacement and periodic physical examinations. It should recognize the specific occupational hazards that may exist, such as transmissible or communicable diseases between animal and man. An immunization schedule appropriate to the animal care program should be developed. For example, it is important to immunize animal care personnel against tetanus. Those handling newly arrived carnivores and bats can be protected against rabies by preexposure immunization. Consideration should be given to obtaining and storing individual preexposure sera for future diagnostic purposes. Education of employees in personal hygiene, health, and and safety is recommended.

(*b*) Diseases of nonhuman primates transmissible to man can be a serious hazard to personnel. The disease prevention program should include regularly scheduled examinations for tuberculosis. Protective clothing such as full-

length gowns, gloves, masks, and face shields should be available for use when handling nonhuman primates.

D. Feeding, watering, and identification of laboratory animals

1. *Feeding*

All laboratory animals should have daily access to feed according to their particular requirements.* The food should be clean, free of contaminants, palatable, and nutritionally adequate. It should be fed in amounts sufficient to assure normal growth in immature animals and maintenance of normal body weight in adults.

2. *Watering*

Laboratory animals should have daily access to water, according to their particular requirements. Ordinarily, drinking water should be available at all times unless adequate water is supplied in the diet. Watering devices such as drinking tubes and spouts, and automatic waterers should be examined routinely to assure their potency.

3. *Identification and records*

Laboratory animals should be identified by placing identification cards in the animal rooms, on cages, or on racks; by the use of comfortable collars or bands on the animals; by stains of various colors; by ear punching; by tattooing; or by other appropriate means. Identification cards should include such information as the source of the animal, name and location of the responsible investigator, pertinent dates, and any specific instructions for animal care personnel.

Records on experimental animals are essential to good animal care and notations concerning source of origin, vital statistics, and manipulation and eventual disposition are recommended.

E. Diagnosis, control, and treatment of animal diseases

1. All laboratory animals should be observed frequently for clinical signs of illness, injury, or abnormal behavior by a person capable of recognizing such signs. (See sec. II.) It is good practice to observe the animals daily under ordinary circumstances. All deviations from normal and deaths from unknown causes should be reported promptly to the person responsible for animal disease control.

2. Persons qualified by experience or training should direct the

* As specified in the National Research Council Series on nutrient requirements for animals. (See Appendix VII, page 53.)

control and treatment of nonexperimentally induced animal diseases and other abnormal conditions.

3. Animals that develop abnormalities rendering them unsuitable for laboratory purposes should be treated or painlessly killed. (See sec. I.G.)

4. To facilitate the proper diagnosis of abnormal conditions, laboratory services are essential for diagnostic procedures. These should include the physical examination of animals; necropsy; histological and pathological examination of animal tissues; isolating and identifying specific pathogens, and routine and specific laboratory procedures. In many institutions laboratory animal disease diagnostic laboratories have proven to be of exceptional value in supporting research.

5. The control and treatment of animal diseases and other abnormalities should include the appropriate quarantine and isolation of animals (sec. I.F., below); control of animal quality by procurement from reliable sources (sec. I.F); and proper sanitation practices (sec. I.B).

F. Quarantine and isolation of animals

For the purpose of the *Guide*, "quarantine" is defined as the segregation of newly received animals from animals already in use. "Isolation" is the segregation of animals suspected or known to be diseased from animals which are in good health.

1. Newly received animals should be quarantined until their health status has been evaluated.

2. The duration of quarantine may vary according to the species used and the purposes for which they are used. For species such as rats, mice, rabbits, and hamsters, when obtained from reliable sources, the quarantine may be limited to the time necessary for competent inspection. For these and similar species, the control of quality at the source, and knowledge of the environmental history of the animals are effective adjuncts to quarantine within the institution. Where the environmental history of the animals is unknown, such as is commonly the case with dogs, cats, nonhuman primates, and large domestic animals, a more complete quarantine should be employed, including the procedures recommended below. These procedures may take only a few days or as long as several weeks to complete.

3. It is good practice to institute a conditioning program that includes any or all of the following procedures:

(*a*) Physical examination of the animals on arrival, including performance of appropriate clinical and laporatory diagnostic tests.

(*b*) Veterinary care and treatment for ecto- and endoparasites, and other specific prophylactic or therapeutic

procedures, such as immunizations, as necessary, to protact against communicable diseases.

(*c*) Adaptation to the laboratory diet, including supplemental feeding, if necessary, to meet nutritional requirements.

(*d*) Observation of animals within the quarantine area until freedom from signs of communicable disease is assured.

(*e*) Grooming procedures such as bathing, dipping, drying, and clipping.

4. Should a nonexperimentally induced communicable disease occur during the course of a study, the animal involved should be isolated from other animals, and their care should be managed so as to minimize or prevent direct or indirect contact with healthy animals. Management of such diseased animals should be carried out according to the recommendations in section I.E.

G. Euthanasia

Euthanasia (humane killing) should be performed by the director of animal care, the responsibile investigator, or trained persons under their immediate supervision.

1. *Methods and materials*

(*a*) The choice of method depends upon the species and the purpose for which the animal was used. The method of killing should not interfere with the types of postmortem tests to be performed.

(*b*) For laboratory animals such as the dog, cat, and the nonhuman primate, barbiturate solutions of high concentration should be administered intravenously or intraperitoneally. Guinea pigs and rabbits can also be swiftly and humanely killed by injecting barbiturate solutions intraperitoneally.

(*c*) Mice, rats, and hamsters can be killed by the use of ether, chloroform, nitrogen, or CO_2 in a special chamber. Care should be taken to ensure that the chamber is not overcrowded. The explosive hazard attending the use of ether and the pathological hazard of inhaled chloroform vapors to animals should be recognized.

(*d*) (Optional) Mice, rats, or hamsters can also be humanely killed by such physical methods as the separation of the spinal cord in the cervical area, or a sharp blow at the back of the head. These methods result in instantaneous unconsciousness and death without the excitant stage.

(*e*) In the large domestic animals, thiobarbiturates (1 gm/250 lbs dissolved in 10 to 20 cc of water) administered rapidly (10 seconds) intravenously will produce anesthesia and restraint for a short duration. The animal can then be killed humanely by any method desired.

H. Animal surgery and postsurgical care

1. *Facilities, equipment, and supplies*

If surgery is performed, appropriate facilities and equipment should be provided and the operating area should be run in accordance with accepted surgical practice. Ordinary laboratory facilities can be utilized for nonsterile, terminal procedures, and for so-called "clean surgery" on small animals such as rats, mice, and hamsters. Aseptic surgery can be performed in a laboratory area if the laboratory is suitably designed and equipped. However, if aseptic surgery is performed routinely, an area specifically designed for this purpose should be provided. A suitably equipped area should include the following equipment and supplies:

(*a*) An autoclave or other equipment for effective sterilization of instruments, linens, gloves, gowns, and similar items.

(*b*) A scrub sink for surgical preparation.

(*c*) Operating tables, instrument stands, and tables.

(*d*) An operating light of sufficient power to assure clear illumination of the operative field.

(*e*) Ample utilities such as electric and vacuum outlets, compressed air, and environmental controls that may be needed to support aseptic surgical procedures and maintain good sanitation in the area.

(*f*) Instrument and linen packs appropriate to each surgical procedure.

(*g*) Instruments and equipment for tracheal intubation and artificial respiration.

(*h*) Caps, masks, and scrub suits for personnel in the surgical area.

(*i*) Kick buckets, laundry hampers, and other equipment as necessary for hygienic protection and maintenance.

(*j*) 'Whole blood, fluids, vasopressors, antibiotics, and other supportive drugs which may be needed for surgical procedures.

2. *Operating rules*

(*a*) A facility for aseptic surgery should be directed by a person qualified by experience or training.

(*b*) Operating procedures for the facility should include the proper preparation and anesthetization of animals for surgery (in a separate area), the setting up and maintenance of the operating area, and other assistance needed by the surgeon.

(*c*) Anesthetization should utilize all the necessary procedures and drugs needed to eliminate sensibility to pain

during surgical procedures, as determined by the responsible investigator or the director of animal care.

3. *Postsurgical care*

(*a*) Provisions should be made for the appropriate postsurgical care of animals. Postsurgical care includes such procedures as maintenance of adequate fluid balance; administration of whole blood, antibiotics, analgesics, or other drugs whenever indicated; the recording of rectal temperature; care of the surgical incision; emergency treatment; and similar clinical procedures. The duration of the postsurgical care will vary with the type of surgery performed and the condition of the animal, but it should be provided whenever it is needed, day or night.

(*b*) The intensive postsurgical care area should be equipped for supportive treatment or the necessary equipment should be immediately available. Heating pads or heated cages, steam vaporizers, compressed air, vacuum equipment, oxygen, examination table, and appropriate instruments are the types of equipment which may be needed.

(*c*) Laboratory facilities or services should be made available as needed to follow and support the animal's recovery.

I. Emergencies

Provisions should be made for emergency care, day or night. Emergency operating procedures must be listed. These should include such items as:

(*a*) Name of responsible person or alternate;

(*b*) Means of contacting responsible person or alternate.

II. Personnel

The number and the qualifications of personnel required to support animal care programs depend on a variety of factors which may interact differently in each institution. Among these are the type of institution; its size; the nature of the administrative structure for animal care; the nature of the physical plant; the number and species of the animals maintained; and the nature of the teaching, testing, or research activities. It is evident that these interactions will result in a variety of staffing concepts and "chains of command," and, therefore, no arbitrary statement can be made concerning personnel requirements. The intent of these recommendations is simply to provide guidelines which may be helpful in acquiring staff capable of implementing the criteria described in section I.

A. Professional personnel

Officials of many research institutions have recognized that their animal facilities and animal care programs require professional direction apart from and in addition to that provided by the research worker. They employ specialists in laboratory animal medicine to assist in meeting an increased requirement for high-quality animals maintained under rigorously controlled environmental conditions. Scientists have welcomed this support. The result has been the development of laboratory animal medicine programs serving the scientific staff as an essential "central" resource. The functions vary from institution to institution and may include the provision of a broad range of laboratory, clinical, research, and animal husbandry services. Some of the programs also have independent teaching and research functions.

Most programs of the type described above are staffed by veterinarians having specialized training or experience in laboratory animal medicine. Many are diplomates of the American College of Laboratory Animal Medicine or have equivalent training or experience. (See app. I and II.)

The employment of a full-time staff specifically concerned with an institution's laboratory animal medicine program is recommended. This includes the professional and supporting personnel necessary to implement the veterinary, animal husbandry, and

administrative aspects of the program. However, it may not be feasible in all institutions to employ a large staff for this program because the number of animals maintained may be small and the scope and type of research or other work may not warrant it. In these institutions the use of part-time consultants may prove helpful.

Biomedical investigators traditionally have concerned themselves with animal care problems. They must continue to bear the primary responsibility for the care of their animals. However, the development of laboratory animal medicine as a specialized field has extended the resources and skills available to research scientists to assure high-quality care. The increased size and scope of biomedical research require greater varieties and larger numbers of laboratory animals. This field, therefore, seems destined for further growth because investigators have recognized that it contributes to the well-being of their animals and the success of their research.

B. Animal care personnel

Animal care programs require administrative, technical, and husbandry support. Scientific institutions should make provisions for on-the-job training and the supervision of suitably qualified personnel to assure effective implementation of their animal care programs. (See app. III and IV.)

III. Physical Plant

The physical condition and design of animal facilities to a great extent determine the efficiency and economy of their operation and greatly influence standards for animal care. A well-designed, properly maintained facility is an essential element in good animal care.

Many new animal facilities will be built in the next few years and many existing quarters will be remodeled; thus, the question of what constitutes proper facilities for laboratory animals is important. In most institutions a research building is the product of many compromises, and, consequently, it is not always possible to provide ideal solutions for difficult design problems. Nevertheless, careful planning can help to minimize these problems. This section of the *Guide* deals with the design and construction features that must be considered in the planning and operation of animal facilities.

A. Functional areas

The design, scope, and size of an animal facility depend on the nature of the research activities to be conducted therein, the number of animals to be housed, the requirements for flexibility in the housing of different species, its physical relationship to the rest of the institution, and its geographical location. The following functional areas are considered essential in a modern animal facility:

1. A separate building, a separate wing, one or more floors, or separate rooms where animals can be housed apart from areas of human occupancy. A sufficient number of animal rooms or areas are required to assure separation of species when necessary, or isolation of individual projects; to provide for the receipt, quarantine, and isolation of animals; and to provide for their routine and specialized housing.

2. Specialized laboratories or areas contiguous with or near the animal housing areas for activities such as surgery, necropsy, intensive postsurgical care, radiography, preparation of special diets, and the diagnosis, treatment, and control of laboratory animal diseases. If radioisotopes, toxic substances, or pathogens are to be used, special facilities or areas must be provided.

3. Receiving and storage areas for food, bedding, supplies, and equipment.

4. An office for the administration, supervision, and direction of the facility.

5. Showers, sinks, lockers, and toilets for personnel.

6. An area for washing and sterilizing equipment and supplies. Depending upon the volume of work, a well-equipped cleaning area includes facilities such as a cage-washing machine, a bottle- or glassware-washing machine, a rack-washing machine or area, a waste can-washing machine or area, a utility sink, an autoclave for equipment, food, and bedding, and separate areas for holding soiled and clean equipment. (See p. 8, sec. 2 (b) and (c) and p. 43, sec. G.4.)

7. An incinerator capable of burning all animal waste and refuse, or facilities for safe and sanitary storage of such waste prior to removal.

8. An area suitable for food consumption should be provided if personnel regularly eat in the facilities that house animals.

B. Service areas in relation to the total size of the animal facilities

1. An area or areas equal in square feet to at least 25 percent of the animal housing space should be set aside for the service functions of the animal facility. The service functions include such activities as cage washing and sterilization, storage, diagnostic laboratory and office activities, receiving and quarantining of animals, and refuse disposal.

2. Where an animal facility is 1,000 square feet or less in size, it may be possible to carry out the service functions in an area that serves other activities as well. However, a separate facility should be available for washing and sanitizing animal cages.

3. In a facility up to 10,000 square feet in size, separate rooms or areas should be provided for the following service activities:

(*a*) Receipt and quarantine of newly received animals.
(*b*) Receipt and storage of animal food and supplies, including refrigeration.
(*c*) Cleaning, sanitizing, and storage of cages and equipment.
(*d*) Incinerator or protected area for refuse.
(*e*) Lavatory facilities for personnel.
(*f*) Office for supervisory and administrative personnel.
(*g*) Laboratory facilities.

4. In institutions having several separate animal housing facilities, or one large area, which total more than 10,000 square feet, rooms or areas should be provided for all of the service functions listed in item 3 above. In addition, clinical laboratory facilities should be provided for the diagnosing of animal diseases (sec.

I.E). Some duplication of service areas may be required if the animal facilities are widely dispersed.

C. Physical relationship of animal facilities to research or teaching laboratories

Animal housing areas support research and teaching laboratories. Good animal husbandry and human comfort require physical separation of animal facilities and human occupancy areas such as offices and laboratories. This can be accomplished by locating the animal quarters in a separate wing or on a separate floor in a multistory building, or by providing a separate building for animal housing. A one-story building for animal housing permits the most efficient and economical animal care operation, since vertical transport is avoided; however, this may be the least desirable choice for the research workers because of inaccessibility to their laboratories. Efficiency and economy in utilization of the research workers' time must be considered in planning animal facilities. Careful planning should make it possible to locate the animal areas adjacent to or near the laboratory areas; but they should be physically separated from the laboratories by barriers such as entry locks, separate corridors, or separate floors.

Many institutions have recently acquired and developed farm type facilities. These are useful for conditioning, isolation, quarantine, and long-term housing and maintenance of large domestic animals.

D. Construction guidelines

Maintenance costs as well as initial construction costs should be considered when selecting building materials, and these materials should facilitate efficient and hygienic operation of the animal quarters. Durable, waterproof, fire-resistant, seamless materials are most desirable for interior surfaces. Paints and glazes, in addition to being highly resistant to chemical solvents, cleaning agents, and scrubbing, should be highly resistant to high-pressure sprays and impact.

1. *Corridors*

Corridors should be at least seven feet wide to permit easy flow of personnel and equipment. The floor-wall junction should be coved to facilitate cleaning. Provisions should be made for curbs or guardrails, or bumpers on equipment to protect the walls from damage. Exposed corners should be protected by reinforcing them with steel, or another durable material up to a height of six feet. Corridors leading to dog kennels should be provided with a noise trap such as a double-door entry lock. Wherever possible,

access to utilities such as waterlines, drainpipes, and electrical connections should be through service panel or shafts located in the corridors outside of the animal rooms.

2. *Animal room doors*

Animal room doors should swing toward the corridor only if there is a recessed vestibule. They should be at least 42 inches wide and no less than 84 inches high to permit easy passage of racks and equipment. The doors should fit tightly within the frames and sills and the frames should be completely sealed to provide a barrier against the entrance or harboring of vermin. Metal or metal-covered doors are preferable. They should be equipped with kickplates and be self-closing. Recessed handles are recommended. Viewing windows are desirable.

3. *Exterior windows*

Exterior windows and skylights are not needed in the animal rooms if adequate ventilation and lights are provided. (See sec. D.7 and D.8). If windows are provided, it is preferable that they be nonopening, without sills or horizontal surfaces where dust can collect, of an insulating construction (in areas of temperature extremes), and sealed with a material that will withstand repeated washing and disinfecting. If windows are opened for ventilation purposes, effective screening is essential.

4. *Floors*

Floors should be smooth, waterproof, nonabsorbent, nonslip, wear resistant, acid and solvent resistant, capable of being scrubbed with detergents and disinfectants, and capable of supporting racks, equipment, and storage areas without gouging, cracking, or pitting. Depending upon the functions carried on in specific areas, the materials specified should be of a monolithic nature or should have a minimum of joints. Some materials that have proven satisfactory are terrazzo, cupric oxychloride cement, smooth hard-surfaced concrete, neoprene terrazzo, and special hardened rubber-base aggregates. A continuous waterproof membrane should be provided. Where sills are installed at the entrance to the room, they should be designed so as to allow for the passage of equipment.

5. *Walls*

Walls should be monolithic, waterproof, painted, glazed or smooth, free of cracks or imperfect junctures at the floor, ceiling, corners, or utility penetrations. Materials should be acid or solvent resistant, capable of withstanding scrubbing with detergents and disinfectants. The walls must be capable of withstanding

water under high pressure. Provision should be made to protect walls from damage by movable equipment.

6. *Ceilings*

Ceilings formed by the concrete floor above are satisfactory if properly smoothed, sealed, and painted. Furred ceilings of plaster or fire code plasterboard should be sealed and painted with a washable finish. Exposed pipes and fixtures at ceiling level are undesirable, especially in nonhuman primate rooms, because of the problems created by escaped animals.

7. *Ventilation, temperature, and humidty control*

(*a*) Effective ventilation is necessary to maintain a low concentration of atmospheric contaminants, such as odors or microorganisms, to regulate room temperature and to promote comfort. Important factors for proper ventilation are temperature, humidity, and air movement. The ability to maintain odorless facilities depends upon the number and species of animals housed, and the sanitation practices, as well as upon a properly designed ventilation system.

(*b*) Ideally, a system should permit individual adjustments within ± 2° F. for any temperature within a range of 65° to 85° F. The relative humidity should be maintained year round within a range of 30 to 70 percent, according to the needs of the species being maintained. A mechanical ventilation system is necessary in most indoor facilities in order to meet these requirements. Air conditioning is highly recommended since it promotes environmental stability. Temperature and humidity should be controlled individually in each animal room or groups of rooms serving a common purpose. The animal facility and human occupancy areas should be ventilated separately. The system should provide frequent changes of room air without drafts. Ten to fifteen changes per hour are recommended. There should be no recirculation of room air unless it has been filtered to remove contaminants. An acceptable alternative is to provide zone control with limited recirculation of room air. Operation of the system at 74° ± 4° F. and 50 ± 20 percent relative humidity, using 100 percent fresh air during temperate weather and 50 percent fresh air during periods of temperature extremes is acceptable for situations where routine housing of animals is the primary requirement. (See sec. III.G and H for special situations.)

(*c*) Maintenance of a given room temperature within even

closer tolerances, such as ± 1° F., and of relative humidity within 5 percent, using 100 percent fresh air at all times, may be required for certain experiments. Such controls may be essential, for example, where precise environmental studies are in progress. Recording devices for temperature and humidity should be installed in such rooms, together with a failure alarm system that may control utilities and air supply. The sensing elements should be placed at approximately the average level of the animal cage floors.

(*d*) If small animals (for example, dogs, and rabbits) are housed outdoors with no access to indoor facilities, provisions to aid their natural temperature regulation are essential. When the ambient temperature falls below 50° F., some form of shelter and clean nesting materials should be provided. Materials such as shavings, straw, or paper can be used. When the ambient temperature exceeds 85° F., shade must be available and animals should be able to burrow or lie on materials several degrees cooler than the surrounding air.

8. *Power and lighting*

The electrical system should provide ample lighting, sufficient power outlets, safety provisions (such as explosion proof outlets in rooms where volatile, explosive anesthetics may be used), and waterproof outlets where water is used in cleaning.

Lighting should be uniformly diffused throughout the area to be served. Although 10 to 15 foot-candles of light are considered sufficient to maintain vital animal activity and rhythms, at least 50 foot-candles are necessary for ordinary servicing of animal rooms. For most animal housing areas, a minimum lighting intensity of 75 foot-candles at the level of the cage racks is recommended. Animal treatment and examination areas should have a minimum of 100 foot-candles at the work surface.

Surface-mounted fluorescent fixtures are efficient and are available in a variety of fixtures that can also be sealed to the ceiling. Incandescent or fluorescent lamps in tightly sealed fixtures hung from the ceiling are adequate. Recessed fluorescent lamps, sealed within the ceiling, are acceptable. Light fixtures should be properly sealed to prevent their harboring vermin.

Adoption of a standard daylight equivalent for windowless animal facilities is recommended. This can be accomplished by providing a centrally controlled, timed, off-on lighting system; or by attaching a simple timer to the light switch in each animal room.

Provision should be made for emergency lighting and power in the event of a power failure.

9. *Drainage*

All waste fixtures and equipment should be connected to soil and waste pipes through traps. If floor drains are used, the drainpipes should not be less than four inches in diameter. In heavy-use areas such as dog kennels, drains at least six inches in diameter are recommended. A flushing drain, much like an ordinary toilet bowl, set in the floor, is an effective aid in the disposal of solid waste. A porous trap bucket to screen out solid waste provides an effective alternative to removal of solid materials through the drain. All drainpipes should have short runs to the main, or they should be steeply pitched from the opening. When drains are not in use they should be capped and sealed to prevent any backflow of sewer gases. Lockable drain covers are useful in preventing use of the drains for disposal of materials which should be swept up and removed by other means. (See sec. III. G and H.)

Floor drains are not essential in animal rooms for species such as rats, mice, or hamsters. Floors in such rooms can be maintained satisfactorily by wet vacuuming, or by sweeping and mopping with appropriate disinfectants or cleaning compounds. The recommended minimum pitch of floors, where floor drains are used, is one-quarter inch per foot. Proper pitching of the floor is an essential element in establishing good drainage in animal rooms; and particular attention should be paid to this detail in planning animal facilities.

10. *Storage areas: food and bedding, refuse, equipment*

In areas where delivery schedules are reliable, the amount of space required for food and bedding storage can be held to a minimum. The best utilization is achieved by maintaining constant turnover.

Bulk supplies of food and bedding should not be stored in animal rooms. A separate area or room should be available in which food and bedding can be stored off the floor on pallets, racks, or carts. A continuing pest control program is essential. It is most desirable for the storage areas to be vermin-proof.

Food storage areas should be physically separated from refuse areas. Temperatures in the storage rooms may be the ambient temperature. However, it is good practice to hold packaged animal feeds (pellet rations) at 50° F. or less. Refrigerated storage should be available for meats, fruits, vegetables, and other perishable items.

Separate storage for animal waste and dead animals is essential. Refuse storage areas should preferably be kept below 45° F. to reduce putrefaction of waste or animal carcasses. Obnoxious

materials should be covered or packaged. The area should be constructed so that it can be kept clean and free of vermin.

Adequate space for storing equipment is essential. This is an effective way to prevent clutter in animal rooms. All storage areas should be kept clean.

11. *Noise control*

Noise, both from the animals and animal-care routines, is inherent in the operation of animal facilities. Noise may be undesirable because of its effect on personnel and on the animals themselves. Inasmuch as background and 'operational' noise are an environmental factor in the control of animal experiments, they should be considered in the design of animal facilities.

Ordinarily, species such as rats, mice, guinea pigs, cats, and hamsters do not create a disturbing amount of noise in animal facilities. Noise from a monkey colony can be troublesome, and, invariably, dogs are the cause of unwelcome noise. Barking is disturbing to personnel working inside and outside of the animal facilities. It may also pose important public relations problems if there are residences near the laboratory.

The physical separation of human and animal occupancy areas is the best way to minimize disturbances to laboratory personnel from the sounds of animals and animal-care routines. Within animal facilities, noisy activities such as cage washing and refuse disposal should be carried out in rooms or areas separated from the animal housing areas. Unwelcome noise from animal-care routines can be minimized by appropriate indoctrination and training of personnel; by using rubber-tired casters and rubber bumpers on carts, trucks, and racks; and by transferring major cage cleaning activities from animal rooms to areas specifically designed for this purpose.

The use of sound-reducing materials in animal rooms can be helpful. Concrete walls are more effective than metal or plaster walls in containing sound because density is more important than acoustical materials in reducing the transmission of sound. Acoustical materials may be used in animal rooms by direct application to the ceiling, or as part of a suspended ceiling, providing the rooms are vermin-proof. The elimination of windows also helps to contain sound.

Where dogs are housed outdoors, such as on the roof of a building, barking sounds can be directed upward by appropriate baffling of the surrounding parapet area. This procedure is helpful only when there are no taller buildings nearby.

12. *Facilities for washing and sterilizing equipment and supplies*

An area for washing and sterilization is essential in order to keep

equipment physically clean, to reduce obnoxious odors, minimize the spread of infectious diseases, and provide for the comfort of experimental animals. Washing and sterilizing are best done outside of the animal rooms in an area specifically designed for the purpose and centrally located, if possible. Consideration should be given to such factors as:

(*a*) Location with respect to animal rooms, traffic flow that separates "clean" and "dirty" areas, elevators, ease of access, and disposal of waste.

(*b*) Soundproofing.

(*c*) Utilities such as hot and cold water, steam, floor drains, and electric power.

(*d*) Proximity to cage and equipment storage areas. It is essential to provide separate holding areas for soiled and clean equipment.

(*e*) Insulation of walls and ceilings where necessary.

(*f*) Ventilation with installation of proper vents and provisions for dissipation of steam.

(*g*) Access doors of sufficient width to assure free movement of equipment.

The use of an animal equipment-washing machine is highly recommended. The machine should provide both wash and rinse cycles, preferably with flexible time settings for each. If sanitization depends on heat for effectiveness, the wash or rinse cycle, or both, should be conducted at not less than 180° F. to assure destruction of most pathogenic organisms. Cultures of "cleaned" equipment should be taken periodically to check the adequacy of the washing routine.

Large pieces of equipment may have to be washed by hand. However, portable cleaners that dispense detergent and hot water or steam under pressure are more efficient than hand cleaning. Some institutions use a booth in the cage-washing area for rack washing. Such an area serves well when equipped with hot and cold water, steam, and a detergent dispenser. It should be specifically vented to exhaust the steam. Where the size of the animal facility warrants the investment, a large washing machine for racks, dog cages, and similar large pieces of equipment is useful. If no machine is available, hand washing of small cages can be accomplished in a large sink or tub, using appropriate detergents, disinfectants, and vigorous scubbing.

A machine for washing bottles and sipper tubes is recommended if large numbers of water bottles are used. Some cage-washing machines may also be used for this purpose. If bottles are washed by hand, powered rotating brushes located at the washing sink are useful. If hand washed, provision should be made for dipping

or soaking water bottles in detergent and disinfectant solutions. A two-compartment sink or tub is adequate for this purpose.

An autoclave is recommended for equipment and supplies in the cage-washing area. Use of an autoclave for animal cages is essential where pathogenic agents are under investigation (See sec. III.G.) In certain specialized facilities such as in production colonies of cesarean derived, defined environment animals, autoclaving or other forms of sterilization of food and bedding may be necessary. However, routine sterilization of food and bedding is not considered essential if care is taken to use clean materials from reliable sources.

E. Large animals

For purposes of the *Guide*, large animals are defined as domestic animals, such as horses, sheep, cows, goats, and pigs.

Conventionally, these animals are housed in pens and barns. Even when ambient temperatures fall below freezing, most large animals prefer to remain outdoors if adequate feed, water, bedding, and shelter are available.

The housing of large, domestic animals in an urban research facility will parallel in many respects the housing of other laboratory animals. Because of their size, however, special consideration must be made for their restraint and confinement. The following sections refer to housing of large animals in rural areas.

1. *Service and feed alleys*

Service and feed alleys should permit easy passage of equipment. In drive-through units, if a tractor and trailer are used, the service alley should be eight to nine feet wide. Feed alleys, four to five feet in width, are preferred although these, too, may vary with the equipment used.

2. *Doors and pen gates*

Animal exit or entry doors should be four to six feet in width. The doors should fit tightly to provide a barrier to vermin. Metal flashing (28 gage) on the bottom of wooden doors will prevent rodent damage. Metal doors are preferable. Doors to large service alleys should be the "overhead or sliding" type. Door sills should not be raised above two inches and a concrete apron should extend outside for at least six feet. Pen or stall gates should be four feet in width and eight feet high for adult horses and cattle. The gate sizes can be smaller for sheep, hogs, and calves, but for accessibility and efficient operation a four-foot width is applicable even to small pens. Doors to outside pens for hogs should be two to two and a half feet wide and three feet high.

3. *Windows*

Windows are unnecessary. If they are provided, they should be placed at a high level to prevent breakage by animals. The inside glass should be framed flush with the wall, eliminating sills where dirt and dust can collect. Insulating glass is preferred. Approximately one square foot of window space per 30 to 40 square feet of floor space is recommended. The windows are generally fixed, but in some cases can be opened to provide ventilation. If the windows are opened, screening should be provided.

4. *Floors*

Floors should be waterproof, nonslip and wear resistant. They should be resistant to severe weather and weak acid or alkali solutions. A good quality concrete floor with a hard but moderately rough surface to prevent animal slipping is preferred. A floor thickness of four inches is recommended for light loads and one of up to six inches if tractors or trucks are used. A waterproof membrane should be laid prior to pouring the floor.

5. *Walls*

Walls should be waterproof, painted, smooth, or glazed and free from cracks or imperfect junctures. Double-wall masonry (cavity insulation) or single masonry with inner insulation containing vapor barriers is recommended.

6. *Ceilings*

A ceiling height of eight and a half feet is recommended for most large animal facilities. Concrete ceilings are satisfactory if sealed. A waterproof membrane is frequently used. Plywood or asbestos board is suitable, but all joints should be sealed.

7. *Ventilation, temperature, and humidity control*

(*a*) When large animals are maintained outdoors and ambient temperatures fall below freezing, areas protected against prevailing winds must be provided. Adequate bedding should be provided, and shade must be provided when the ambient temperature exceeds 85° F.

(*b*) Indoor facilities require adequate ventilation to control moisture and odor. A ventilating system capable of exhausting 100 cfm per 1,000 pounds of animal weight is recommended. The minimum temperature should not be lower than 40° F. A minimum of four air changes per hour in the winter and 15 air changes per hour in the summer should be provided. Drafts on the animals should be avoided. In areas with extremely high ambient tem-

peratures, the facility temperature cannot be kept lower than the environmental temperature and air conditioning may be necessary.

8. *Power and lighting*

The electrical system should provide adequate power for the operation of all electrical equipment. Outlets should be conveniently located and the number used will depend on existing codes and intended uses. Switches for operational machinery should be readily accessible and located clear of machinery to prevent injury to the operator. Provisions should be made for emergency power in case of a power failure.

Lighting should be uniformly diffused throughout the facility. To be adequate for servicing, it is necessary to deliver 10 to 20 foot-candles of light at a point one foot above the floor. Higher levels of lighting may be required for special areas such as treatment rooms. In windowless facilities a controlled timed off-on system may be used.

9. *Feed storage*

Feed storages should be separated from manure disposal areas. The storage area should be minimal so that continual turnover is possible, depending on the availability of supply. The feed storage area should be clean and verminproof. A regular vermin control program should be established. Sacked concentrates should be stored off the floor.

10. *Waste disposal*

Daily removal of manure from indoor facilities is recommended. If manure is held before disposal, it is recommended that storage of manure spreaders or wagons should be indoors or in screened areas.

11. *Outdoor facilities*

(*a*) Waterers should be located on concrete or paved platforms. In cold climates, heating devices are necessary to prevent freezing. The waterers should be conveniently located and all-weather access should be provided.

(*b*) Feeding platforms and bunks should be centrally located and all-weather access should be provided. Concrete or paved platforms are recommended to facilitate cleaning.

(*c*) Outdoor lots should be sloped away from buildings, feeders, and waterers. Low areas should be filled with gravel or crushed rock and sand. Paved or concrete platforms or aprons around buildings and feeders are recommended. The slope should be one inch per foot away from bunks

and waterers and one half inch to three quarters of an inch per foot away from buildings or resting areas.

F. Space recommendations for laboratory animals

The size of a cage, pen, or run and the number of animals to be housed in each are matters of professional judgment. The recommendations in Table I are based on the best available information concerning reasonable space allocations for the routine housing of animals in experiments. They are included here as a guide recognizing that it is impossible to delineate cage sizes with greater precision due to varied research requirements. As has been implied in section I, the adequacy of the housing system must be under continuous review. (sec. I.A.) More detailed housing standards for laboratory animals are available from the Institute of Laboratory Animal Resources, National Academy of Sciences-National Research Council.

The specifications applying to the holding and conditioning of certain species of animals not in research use are stated in the regulations, promulgated under Public Law 89–544. (See app. V.)

TABLE I.—Suggested space for the routine housing of laboratory animals

Species	Weight or age	Type of housing	Overall size (inches)			Number of animals	Housing area/animal	
			Width	Depth	Height		Square feet	Square inches
Dogs [1]	Up to 15 kg.	Pen or run	48	72	-------	3	8	---------
	15 to 30 kg.	Pen or run	48	72	-------	2	12	---------
	Over 30 kg.	Pen or run	48	72	-------	1	24	---------
	Up to 15 kg.	Cage	36	32	32	1	8	---------
	15 to 30 kg.	Cage	48	36	36	1	12	---------
	Over 30 kg.	Cage	Refer to footnote		1	---------	---------	---------
Cats	Up to 4 kg.	Cage	18	24	24	1	3	---------
	Over 4 kg.	Cage	24	24	24	1	4	---------
		Group cage or pen.	36	48	72	3–6	2–4	---------
Nonhuman Primates [2]	Up to 1 kg.	Cage	18	10	18	1–2	0.6–1.2	---------
	1–3 kg.	Cage	24	18	24	1–2	1.5–3	---------
	4–5 kg.	Cage	24	24	30	1–2	2–4	---------
	6–10 kg.	Cage	30	30	36	1	6	---------
	Over 10 kg.	Cage	36	30	48	1	7.5	---------
Rabbits	Up to 4 kg.	Cage	18	24	16	1–2	1.5–3	---------
	4–5 kg.	Cage	24	24	16	1	4	---------
Guinea pigs	Up to 350 g.	Individual cage.	8	12	8	1	---------	96
	Over 350 g.	Individual cage.	12	12	8	1	---------	144
	Up to 350 g.	Group cage	14	20	8	2–4	---------	70–140
	Over 350 g.	Group cage	18	20	8	2–4	---------	90–180
Hamsters		Individual cage.	8	12	8	1–6	---------	16–96
		Group cage	14	20	8	Up to 10	---------	28 or more.

TABLE I.—Suggested space for the routine housing of laboratory animals (continued)

Species	Weight or age	Type of housing	Overall size (inches)			Number of animals	Housing area/animal	
			Width	Depth	Height		Square feet	Square inches
Rats	150–250 g	Individual cage.	8	12	8	1–3		32–96
		Group cage	14	20	8	4–10		28–70
Mice	20 g	Small group	8	12	5	5–10		10–20
		Large group cage.	12	18	5	10–20		11–22
Chickens (adult) [3].		Individual cage.	8	18	21	1	1	
		Group cage	36	24	24	2–4	1.5–3.0	
Pigeons	0.5–0.8 kg	Cage	30	30	15	5–7		130–180
Small birds	100–130 g	Cage	6	10	6	1–2		30–60
	100–130 g	Group cage	24	30	6	24		30
Cattle (adult)	350 kg	Stanchion	42	56		1		
	450 kg	Stanchion	45	60		1		
	550 kg	Stanchion	48	64		1		
	650 kg	Stanchion	51	68		1		
	750 kg	Stanchion	54	72		1		
	550 kg	Pen	120	144		1	120	
	650 kg	Pen	120	168		1	140	
	750 kg	Pen	120	180		1	150	
	50–75 kg	Pen	48	72		1	24	
Cattle (calves)	1½–10 mo.	Group pens				Up to 10	20–25	
	Over 10 months.	Group pens				Up to 10	30–40	
Cattle (adult)		Loose housing [4].					50–08	
Horses	500–750 kg	Tie stall	66	96		1	44	
Sheep and goats.	500–750 kg	Pen	144	144		1	144	
Female with young.		Pen					15–22	
Adult male		Pen					20–30	
Hogs						1	20–30	
Adult sow.		Pen				1	25–40	
Sow with pigs.		Pen				1	48–88	
Adult boars		Pen				1	30–80	
	18–45 kg	Pen					6–12	
	45–100 kg	Pen					12–16	

[1] These recommendations may require modifications according to the body conformations of particular breeds. As a further general guide, the cage dimensions should be: (a) the height of the dog at the withers, plus at least six inches (height); (b) the length of the dog from the tip of the nose to the base of the tail, plus at least six inches (width and depth).

[2] These recommendations may require modifications according to the body conformations of particular species.

[3] Provide ample head room to stand erect without crouching.

[4] Loose housing is outdoor housing that includes an open shed for shelter.

G. Special facilities needed for biological safety in infectious disease units

The materials used in the construction of infectious disease units and other animal facilities are similar. However, in the

design of infectious areas, the need for effective isolation is obviously of greater importance, especially where diseases that are transmissible to man are under investigation. An infectious disease unit should be separated from holding areas for normal animals. The unit should be close to, or part of, the laboratory where the work is being done—either in a separate building or in an isolated part of a larger building.

Several special facilities should be incorporated into infectious disease units to aid in the protection of personnel and to prevent cross-infection among animals in the colony. Examples are:

1. Pass-through locker rooms for the storage of clean street clothing and the changing into laboratory clothing.

2. Air lock entry to and from the infectious disease unit, preferably with ultraviolet light barriers within the lock.

3. An area for the removal of contaminated clothing should be located at the exit, between the ultraviolet lock and a shower. The exit from the shower should lead to the locker room.

4. An autoclave to sterilize cages, bedding, watering devices, feeders, and waste before cleaning or removal. Some institutions place pass-through autoclaves in a wall between the animal room and the cage-washing room or corridor. This makes it possible to sterilize equipment and supplies entering or leaving the room, and establishes a flow system from "contaminated" to "clean." Automatic interlocks may be used to prevent the door on the clean side from being opened until a sterilization cycle is completed. If equipment is sterilized before it leaves the infectious disease unit, it may be washed in a machine serving other areas. However, a separate washing area should be provided in large units.

5. Animal rooms in infectious disease units should be ventilated under negative pressure with respect to corridors or adjoining noninfectious areas. Ten to fifteen changes of conditioned air per hour generally are sufficient for all needs. There should be no recirculation of room air in infectious areas.

Exhaust air from the units should be filtered. Spun glass filters having an efficiency of 99 percent or greater are recommended. It is important that the filter frame be sealed tightly in the plenum chamber to prevent leakage of unfiltered air. Electronic precipitation is effective, but the maintenance cost of this type of system is high. Frequent servicing is necessary to maintain rated filtration effectiveness. Incineration is another effective air treatment system, but it is expensive, except when the volume to be incinerated is small (75 to 90 cubic feet per minute or less). Large oil- or gas-fired incinerators are feasible for sterilizing large volumes of air containing highly infectious organisms.

Ordinarily, incineration of air is unnecessary, except in the highest risk areas, such as where dangerous aerosols are used.

6. Special rack and caging systems may be helpful, depending on the organism under study and the mode of exposure of the experimental animals. Ultraviolet lamps and reflectors have been found helpful in controlling the air-borne spread of infections between cages. They should be attached in a horizontal position at both ends of each cage rack shelf to provide a band of radiation across the top of the cages. The radiation is effective in reducing the escape of air-borne vegetative organisms from animal cages. It is not as effective against bacterial spores. Ultraviolet lamps should be effectively shielded to protect animals and personnel from eye damage. Protective goggles are necessary.

Several types of ventilated cages are available. They are useful where air-borne organisms are under investigation. Ventilated lids can be made to fit ordinary animal cages. This entails the use of airtight gaskets around the rim of the lid, an exhaust pipe that can be connected to a central exhaust system, and an air intake equipped with a glass fiber filter. More complex units, such as Horsfall cubicles or flexible film isolators, may also be useful for this type of work.

7. Ventilated cabinets or hoods are recommended for the inoculation of animals with infectious organisms and for necropsy of infected animals. These should be equipped with viewing windows, glove ports, lights, and service piping for gas, air, water, and a vacuum. A 250-cubic-feet-per-minute air filter will exhaust air from the cabinet effectively except during the most hazardous types of infectious disease research. With this system a high-velocity air flow into the cabinet is essential for safety.

8. Disinfectant vaporizers are helpful in decontaminating an animal room following the conclusion of experiments and removal of all animals. The room should be sealed; one milliliter of 37 percent formaldehyde should be vaporized for each cubic foot of air space and allowed to act for six to eight hours. The room temperature should be at least 70° F. and the relative humidity 80 percent during the decontamination procedure. Beta propiolactone, used in the same way as formaldehyde, in a concentration of 300 milligrams per cubic foot, is also an effective air and surface decontaminant.

Ancillary facilities such as sinks and hose bibs in the rooms housing infected animals are recommended to facilitate cleaning and disinfection.

H. Special requirements for radiation safety

Radiation safety is a fundamental obligation in housing radio-

active animals. In accordance with federal, state and local regulations, a radiation safety officer should be appointed to supervise activities involving the use of radionuclides, including the maintenance of records listing procedures and methods for the storage and disposal of waste. Such records should be available to the director of the laboratory animal facility. The primary purpose of the radiation safety program is the protection of personnel and animals through proper monitoring and shielding, and other protective measures.

1. An area should be provided for housing radioactive animals in accordance with federal, state and local regulations. This may be done by holding such animals in well-ventilated radiochemical fume hoods or glove boxes designed for this purpose; by designating part of an animal room as a radiation area; or by treating the entire holding room as a radiation area. If significant levels of gamma ray emitters are to be used, appropriate shielding may be required; appropriate ventilation should also be provided. Routine servicing of these animals may require special consideration to minimize the hazard to animal handlers.

2. To protect against undue radioactive contamination of animal rooms, all surfaces should be nonporous and easily washable. Cracks and crevices should be sealed. Strippable materials or disposable waterproof-backed blotting paper is recommended for application to walls, floors, and bench tops. Rubber or vinyl tiles, or linoleum, applied over a concrete floor will provide adequate protection since these materials are nonporous and can be lifted if necessary. Epoxy resin paints or surfacing materials will seal plaster walls effectively if properly applied.

3. To facilitate decontamination, stainless steel is recommended for animal cages and sinks in preference to galvanized steel, porcelain, or soapstone. Rough surfaces, such as non-smooth welds, which are difficult to decontaminate, should be avoided.

4. Work surfaces, such as bench tops and the interior of animal-holding hoods, should be covered with strippable coatings or disposable waterproof-backed blotting paper. Stainless steel trays should be used to cover the bench top and the floor of the hood.

5. Personal dosimeters and survey equipment must be used in accordance with federal, state and local regulations.

6. Facilities for disposal of radioactive animal waste:

(*a*) Gaseous radioactive wastes may be diluted with air by release in hood effluents. Volatile wastes in combustible materials may be released by incineration, provided that insoluble particulates of high specific activity are not permitted to escape in the effluent. Incineration is also a means of reducing the bulk of nonvolatile materials to about 20 percent of their original weight. Small numbers

of animals containing small amounts of radionuclides are readily disposed of by incineration. Large numbers may require concentration by incineration or other means, followed by special disposition. The solid radioactive wastes should be divided into burnable and nonburnable portions at the point of origin.

(*b*) Water-soluble waste may sometimes be disposed of by dilution in the sewer system. When this method of disposal is used, the possibility of reconcentration within the diluting medium, as well as the expected dilution within the sewer system, must be considered. The quantities disposed of must be controlled so that hazards are not encountered by sanitation and sewage plant personnel.

(*c*) Storage facilities for radioactive animal carcasses and excreta should be provided until the quantities are reduced sufficiently for disposal by dilution, or until they can be disposed of as ordinary stable wastes. Such wastes should be monitored by the institutional radiation safety officer. Special shielding of the storage area may be required. To minimize waste control and disposal problems, the smallest animal capable of fulfilling the experimental requirements should be used.

(*d*) Mechanical washing equipment should be of a type that will facilitate decontamination of cage equipment but will not itself accumulate radioactive waste. For example, radioactive cages should not be washed in machines which recirculate the wash solution.

(*e*) One hundred percent fresh air should be circulated in animal rooms. There should be no dilution or recirculation of room air. Filtration of exhausted air is necessary where high levels of radionuclides are present.

Appendix I

TRAINING PROGRAMS IN LABORATORY ANIMAL MEDICINE

Laboratory animal medicine is a specialty of veterinary medicine that is concerned with the biology of healthy and diseased laboratory animals. The purpose of postdoctoral training in laboratory animal medicine is to provide a broad basic foundation upon which the trainee can build a career either in teaching and research in laboratory animal medicine or in the professional direction of animal facilities.

A list of the program directors at institutions offering training for graduate veterinarians follows. Special research and postdoctoral fellowships in the fields of laboratory animal science and medicine are also sponsored by the Animal Resources Branch, National Institutes of Health, Westwood Building, Bethesda, Maryland 20014.

Col. William F. Bills, Chief, Veterinary Sciences, Aerospace Medical Division, USAF School of Aerospace Medicine, Brooks Air Force Base, Texas 78235

Dr. Kenneth F. Burns, Prof. and Chairman, Dept. of Vivarial Science and Research, Tulane University School of Medicine, 1430 Tulane Ave., New Orleans, La. 70112

Dr. Leo K. Bustad, Director, Radiobiology Laboratory, School of Veterinary Medicine, University of California, Davis, Calif. 95616

Dr. Thomas B. Clarkson, Prof. and Head, Dept. of Laboratory Animal Medicine, The Bowman Gray School of Medicine, Winston-Salem, N.C. 27103

Dr. Bennett J. Cohen, Prof. of Laboratory Animal Medicine and Director, Unit for Laboratory Animal Medicine, The University of Michigan, Ann Arbor, Mich. 48104

Dr. A. I. Flowers, Prof. and Head, Dept. of Veterinary Public Health, College of Veterinary Medicine, Texas A&M University, College Station, Texas 77843

Dr. Robert J. Flynn, Director of Animal Facilities, Div. of Biological and Medical Research, Argonne National Laboratory, Argonne, Ill. 60440

Dr. Donald B. Gisler, Assoc. Prof. and Director of Laboratory Animal Medicine, College of Veterinary Medicine, Ohio State University, 2578 Kenny Road, Columbus, Ohio 43221

Dr. Keith L. Kraner, Director, Dept. of Laboratory Animal Medicine, School of Medicine, University of Missouri, Columbia, Mo. 65201

Dr. C. Max Lang, Director, Animal Resource Facility, Milton S. Hershey Medical Center, Pennsylvania State University, Hershey, Pennsylvania 17033

Dr. Robert F. Locke, Program Chairman, Veterans Administration Resident Investigator Training Program, V. A. Hospital, Hines, Ill. 60141

Dr. Edward C. Melby, Assoc. Prof. and Director, Division of Laboratory Animal Medicine, Johns Hopkins University School of Medicine, Baltimore, Md. 21205

Dr. Alvin F. Moreland, Asst. Prof. of Comparative Medicine and Director of the Animal Dept., J. Hillis Miller Health Center, University of Florida, Gainesville, Fla. 32601

Dr. Orland A. Soave, Director of Animal Care Facility and Clinical Assoc. Prof. of Microbiology, Stanford University School of Medicine, 300 Pasteur Drive, Palo Alto, Calif. 94304

Appendix II

PREREQUISITES FOR CERTIFICATION BY THE AMERICAN COLLEGE OF LABORATORY ANIMAL MEDICINE

Membership in the American College of Laboratory Animal Medicine (ACLAM) is open to veterinarians who are graduates of veterinary colleges accredited by the American Veterinary Medical Association. Members must have a satisfactory moral and ethical standing in the profession and be engaged in the practice of laboratory animal medicine.

Diplomates are those veterinarians who have both met the requirements of training and experience and satisfactorily completed the requirements for certification as prescribed by the constitution and bylaws. Before a candidate will be certified as a diplomate in laboratory animal medicine he must

(*a*) Successfully complete two years of approved postdoctoral training in laboratory animal medicine in a formal program directed by a diplomate of the college,
and have two full-time years of approved experience in the specialty,
or
Have a master's degree in the academic area of biology or medicine, plus four full-time years of approved postdoctoral experience in laboratory animal medicine,
or
Have six full-time years of approved postdoctoral experience in laboratory animal medicine.

(*b*) Publish, or present in suitable form for publication, an acceptable dissertation on some phase of laboratory animal medicine;

(*c*) Successfully complete comprehensive written, practical and oral examinations administered by the college; and

(*d*) On completion of the above, be elected by a majority affirmative vote of the board of directors of the college.

Appendix III

THE ANIMAL TECHNICIAN CERTIFICATION PROGRAM

The Animal Technician Certification Board (ATCB) provides a means of developing uniform standards of laboratory animal technician training and recognizing individual accomplishments.

The program is being developed jointly by the ATCB of the American Association for Laboratory Animal Science (AALAS) and the Committee on Technical Education, Institute of Laboratory Animal Resources (ILAR), National Academy of Sciences—National Research Council. ILAR is responsible for evaluating and defining training goals and recommending course outlines and instructional guides, and for certification qualifications and procedures.

The ATCB is charged with the mechanics of certification. It defines qualifications, prepares its own examinations or approves examinations prepared by training program leaders, conducts or supervises examinations, and awards certificates to successful candidates. Although ATCB does not sponsor training programs, it reviews proposed programs to determine if these will provide the student with the information and skills included in certification examinations. ATCB maintains a record of certified Junior and Senior Animal Technicians and a registry of certified Master Animal Technicians.

Applications for certification are available from, and must be processed through, the Office of the Executive Secretary, American Association for Laboratory Animal Science, P.O. Box 10, Joliet, Illinois 60434.

A. Junior or Senior Animal Technicians

1. For Groups: AALAS branches, biomedical institutions, and allied firms may develop local programs for animal technician training.

   (*a*) Groups interested in sponsoring courses intended to prepare candidates for certification as Junior Animal Technicians and Senior Animal Technicians should submit their curricula to the ATCB for approval.

(*b*) Curricula should include a listing of subject matter, manner of presentation (lecture, lecture and demonstration, laboratory, correspondence course, etc.), sample final examinations, and contemplated passing grade. Subject matter must include, but need not be limited to, the information provided in the *Manual for Laboratory Animal Technicians,* AALAS Publication 67–3.

(*c*) If approved by the ATCB, the course's final written examination will be accepted as the required written certification examination. The sponsoring group must request the appointment of examiners to conduct the required oral and practical examinations for all who have successfully passed the written examination.

(*d*) Applications, fees, and written examination grades are normally submitted to the board chairman through the Office of the AALAS Executive Secretary before the oral and practical examinations are scheduled.

2. For Individuals: Individuals may meet the qualifications by successfully completing acceptable courses other than those arranged through the ATCB. The Ralston Purina Correspondence Course is acceptable training for Junior Animal Technical candidates. Individual or group study of the *Manual for Laboratory Animal Technicians,* AALAS Publication 67–3, prepares Junior and Senior Animal Technician candidates for the written examinations. Candidates must also receive on-the-job training in the proper handling of laboratory animals and in acceptable work practices.

(*a*) As it is neither practical nor feasible to have a member of the ATCB give examinations to individuals, arrangements should be made for several applicants to take the examinations at a location convenient to all. Upon approval by the ATCB, an animal facility or laboratory supervisor or director in the local area may be in charge of the examinations and can act as the central collection agent for applications. A proposal for the date, location, and manner of conduct of the examination should be provided.

(*b*) After the applications and examinations schedule have been forwarded to the AALAS Executive Secretary, the Chairman of the ATCB may appoint additional persons to administer the examinations. A copy of the written examination form for each applicant will be sent to the examiner in charge. The completed examination forms are returned to the ATCB Chairman or to a board member designated to do the grading.

(*c*) If the oral and practical examinations have not been authorized to be administered with the written examination, the Chairman will then arrange for the details of giving these parts.

B. Master Animal Technicians

Examinations for Master Animal Technicians are scheduled at the annual meetings of the AALAS. The time and place are announced in the official program. Regional examinations may be scheduled at the discretion of the ATCB and are only conducted by board members.

Appendix IV

QUALIFICATION FOR CERTIFICATION BY THE AMERICAN ASSOCIATION FOR LABORATORY ANIMAL SCIENCE ANIMAL TECHNICIAN CERTIFICATION BOARD

A. Junior Animal Technician

1. Age: 18 years minimum.
2. Education: Grammar school graduate.
3. Experience: One year of continuous full-time employment in a laboratory animal facility offering approved experience in animal care and use.
4. Reference: Recommendation for examination by immediate superior.
5. Vocational training: Must furnish evidence of having acquired knowledge of basic principles of animal care. Successful completion of a Board-approved course or self study of the *Manual for Laboratory Animal Technicians* will satisfy this qualification. Evidence of having attained equivalent knowledge by other means may be presented for evaluation.
6. Examinations: Applicant must satisfactorily complete the written, oral and practical examinations prepared or approved by the Board. The final written examination of an approved course may be accepted in lieu of a written examination given by the Board. The oral and practical examinations must be given by a Board-appointed examiner.

B. Senior Animal Technician

1. Age: 21 years minimum.
2. Education: High school diploma desirable. After July 1, 1969, a high school diploma or evidence of equivalent education will be required.
3. Experience: Three years of full-time employment as an animal technician in a laboratory animal facility offering approved experience in animal care and use. Credit equal to two years of experience may be allowed at the discretion of the Board for college degrees earned in laboratory animal science or technology.

Partial credit may be allowed for college or technical courses in animal husbandry, biology, or other appropriate disciplines. Transcripts or other supporting documents must be submitted with the application when experience credits are requested.

4. Reference: Recommendation for examination by immediate superior.

5. Vocational training: Must furnish evidence of having acquired advanced knowledge of laboratory animal care and use. Successful completion of a Board-approved course for Senior Animal Technicians or self study of the *Manual for Laboratory Animal Technicians* will satisfy this qualification. Evidence of having acquired equivalent knowledge by other means may be presented for evaluation.

6. Examinations: Applicant must satisfactorily complete the written, oral and practical examinations prepared or approved by the Board. If the applicant has a Junior Animal Technician's certificate, the practical examination will be waved. The final written examination of a Board-approved course may be accepted in lieu of a written examination given by the Board. The oral and the practical examination (if required) must be given by a Board-appointed examiner.

C. Master Animal Technician

1. Age: 24 years minimum.

2. Education: High school diploma or evidence of equivalent education is required.

3. Experience: Six years of full-time employment in laboratory animal technology. A maximum of four years of experience credit may be allowed, at the discretion of the Board, for college degrees earned in laboratory animal science or technology. Partial credit may be allowed for college or technical courses in husbandry, biology, or other appropriate disciplines. Transcripts or other supporting documents must be submitted with the application when experience credits are requested.

4. Reference: Recommendation for examination by immediate professional superior and by a member of the ATCB.

5. Vocational education: Applicant must possess a comprehensive and detailed knowledge of laboratory animal care, facilities, equipment design, and administration; the experimental use of laboratory animals; anatomy, physiology, and basic sciences; and the performance of routine clinical laboratory and surgical laboratory procedures.

6. Examinations: Applicant must appear before the Board and demonstrate by examination, interview, or both, that he possesses the knowledge, skills, and experience described above.

Appendix V

FEDERAL REGULATIONS ON HOUSING REQUIREMENTS FOR LABORATORY ANIMALS

Public Law 89–544 (the Animal Welfare Act), enacted by Congress on August 24, 1966, gave the United States Department of Agriculture authority to promulgate standards governing the humane handling, care, treatment, and transportation of six types of animals. Minimum standards with respect to housing, feeding, watering, sanitation, ventilation, shelter from extremes of weather and temperature, separation by species, and adequate veterinary care were published in the February 24, 1967, *Federal Register*.

The regulations apply to research facilities and dealers that use or supply dogs or cats and are otherwise required by the law to be registered (research facilities) or licensed (dealers). The regulations are not applicable during research or experimentation.

Those regulations that have to do with housing requirements and space allocation follow:

(From Part 3, Subpart A—Specifications for the Humane Handling, Care, Treatment, and Transportation of Dogs and Cats, § 3.4 Primary Enclosures, p. 3274, col. 3.)

"(b) *Space requirements*—(1) *Dogs and cats.* Primary enclosures shall be constructed and maintained so as to provide sufficient space to allow each dog and cat to turn about freely and to easily stand, sit and lie in a comfortable normal position.

(2) *Dogs.* (i) In addition to the provisions of subparagraph (1) of this paragraph, each dog housed in any primary enclosure shall be provided minimum square footage of floor space equal to the mathematical square of the sum of the length of the dog in inches, as measured from the tip of its nose to the base of its tail, plus six inches, expressed in square feet.[4] Not more than 12 adult nonconditioned dogs shall be housed in the same primary enclosure."

[4] This requirement may be computed by using the following equation: (length of dog in inches plus 6) times (length of dog in inches plus 6) = Required area in square inches

$$\frac{\text{Required area in square inches}}{144} = \text{Required feet of floor space.}$$

(3) *Cats.* In addition to the provisions of subparagraph (1) of this paragraph, each adult cat housed in any primary enclosure shall be provided with a minimum of 2½ square feet of floor space. Not more than 12 adult nonconditioned cats shall be housed in the same primary enclosure."

"(a) *General* (2) *Additional requirements for primary enclosures housing cats.*

(ii) Each primary enclosure shall be provided with a solid resting surface or surfaces which, in the aggregate, shall be of adequate size to hold all occupants of the primary enclosure at the same time. Such resting surface or surfaces shall be elevated in primary enclosures housing two or more cats."

(From subpart B—Specifications for the Humane Handling, Care, Treatment, and Transportation of Guinea Pigs and Hamsters, § 3.28 Primary enclosures, p. 3276, col. 2–3.)

"(b) *Space requirements*—(1) *Guinea pigs and hamsters.* Primary enclosures shall be constructed and maintained so as to provide sufficient space for each animal contained therein to make normal postural adjustments with adequate freedom of movement.

(2) In addition to the provisions of subparagraph (1) of this paragraph, the following space requirements are applicable to primary enclosures for guinea pigs:

"(i) The interior height of any primary enclosure used to confine guinea pigs shall be at least 6½ inches.

"(ii) Each guinea pig housed in a primary enclosure shall be provided a minimum amount of floor space in accordance with the following table:

Weight or stage of maturity	Minimum space per guinea pig (square inches)
Weaning to 350 grams	60
350 grams or more	90
Breeders	180

"(3) *Hamsters.* In addition to the provisions of subparagraph (1) of this paragraph the following space requirements are applicable to primary enclosures for hamsters:

"(i) The interior height of any primary enclosure used to confine hamsters shall be at least 5½ inches, except that in the case of dwarf hamsters, such interior height shall be at least 5 inches.

"(ii) A nursing female hamster, together with her litter, shall be housed in a primary enclosure which contains no other hamsters and which provides at least 121 square inches of floor space: *Provided, however,* That in the case of dwarf hamsters such floor space shall be at least 25 square inches.

"(iii) The minimum amount of floor space per individual hamster and the maximum number of hamsters allowed in a single primary enclosure, except as provided for nursing females in subdivision (ii) of this subparagraph, shall be in accordance with the following table:

Age	Minimum space per hamster (square inches)		Maximum population per enclosure
	Dwarf	Other	
Weaning to 5 weeks	5.0	10.0	20
5 to 10 weeks	7.5	12.5	16
10 weeks or more	9.0	15.0	13

(From Subpart C—Specifications for the Humane Handling, Care, Treatment, and Transportation of Rabbits, § 3.28 Primary enclosures, p. 3278, col. 1–2.)

"(b) *Space requirements.* Primary enclosures shall be constructed and maintained so as to provide sufficient space for the animal to make normal postural adjustments with adequate freedom of movement. Each rabbit housed in a primary enclosure shall be provided a minimum amount of floor space, exclusive of the space taken up by food and water receptacles, in accordance with the following table:

Category	Individual weights (pounds)	Minimum space per rabbit (square inches)
Groups	3–5	144
	6–8	288
	9 or more	432
Individual adults	3–5	180
	6–8	360
	9–11	540
	12 or more	720
Nursing females	3–5	576
	6–8	720
	9–11	864
	12 or more	1080

(From Subpart D—Specifications for the Humane Handling, Care, Treatment, and Transportation of Nonhuman Primates, § 3.78 Primary enclosures, p. 3279, col. 3; and p. 3280, col. 1.)

"(b) *Space requirements.* (1) Primary enclosures shall be constructed and maintained so as to provide sufficient space to allow each nonhuman primate to make normal postural adjustments with adequate freedom of movement.

(2) Each nonhuman primate housed in a primary enclosure shall be provided with a minimum floor space equal to an area of at least three times the area occupied by such primate when standing on four feet."

Appendix VI

AMERICAN ASSOCIATION FOR ACCREDITATION OF LABORATORY ANIMAL CARE*

The goals of the American Association for Accreditation of Laboratory Animal Care (AAALAC) are to encourage optimal care for laboratory animals and to provide a mechanism for self-regulation by the scientific community. AAALAC was founded in 1965 by 16 scientific and professional organizations and initiated a voluntary program of accreditation of laboratory animal care methods and facilities.

Upon request, AAALAC's Council on Accreditation will evaluate an institution's laboratory animal facilities. Accreditation is granted upon demonstration that an institution meets AAALAC's standards and requirements.

In determining eligibility for accreditation, AAALAC uses section I of this *Guide,* entitled "Laboratory Animal Housing and Care," as its primary reference standards.

An accredited institution receives a certificate of accreditation which may be retained as long as the accredited status is maintained.

* 4 East Clinton Street, P.O. Box 13, Joliet, Illinois 60434.

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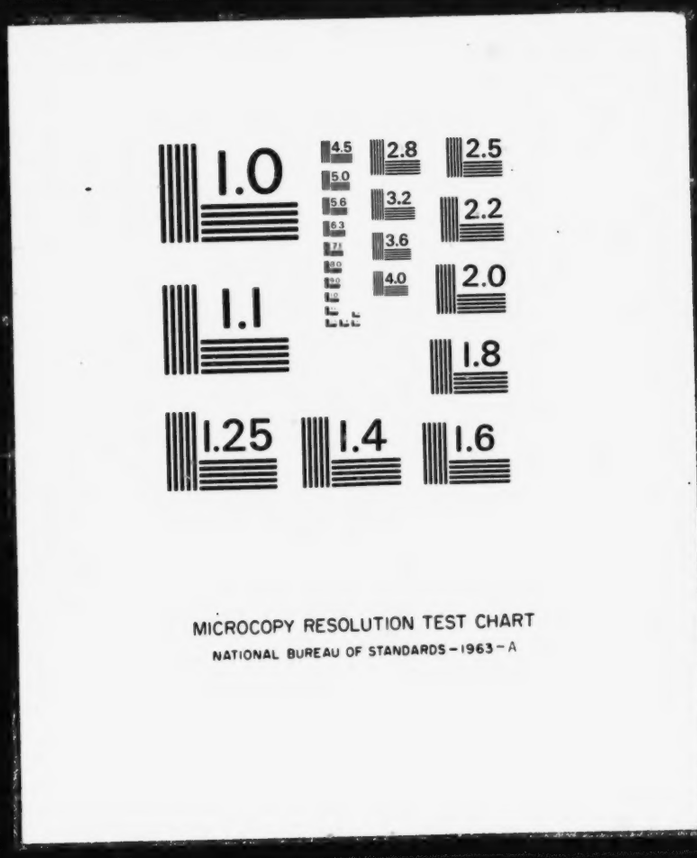

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